

## At the Agricultural Research Service, Bioenergy Is Up and Running

Henry Ford didn't just make Fords—he was also a farmer who regularly received mailings from the U.S. Department of Agriculture (USDA). So it's not surprising that the inscription over the entrance to a Ford administrative building in Dearborn, Michigan, read, "Industrious application of inventive genius to the natural resources of the earth is the groundwork of prosperous civilization."

Now scientists at the Agricultural Research Service (ARS)—and their colleagues in other federal and state agencies, universities, and public and private sector groups—are directing all their inventive genius toward developing the best feedstocks for biofuel production and identifying how they can be sustainably grown. Developing new sources of bioenergy is one of USDA's priorities.

Currently, 78 ARS projects across the country are looking at biofuel production from every possible angle, and the number continues to grow. We're examining switchgrass DNA to see if we can find the genes that regulate traits like disease tolerance or drought resistance, and we'll use that information to find how the best varieties can be managed on farms. This will help growers and biorefiners use the most cost-effective and environmentally sustainable practices for biofuel production, even as they continue to produce the food Americans need.

We're also tracking the types of pathogens that can infect grain ethanol facilities and lower production—and profits.

We're looking at a range of old and new feedstocks for biofuels—such as canola, sugarcane, camelina, *Cuphea*, and sorghum—to assess their potential for cost-effective and sustainable bioenergy-crop production. In Iowa's corn country, we've studied how much corn stover can be harvested for the production of biofuels without increasing soil erosion or compromising soil quality.

Meanwhile, other ARS scientists have found ways to improve dried distiller's grains—a byproduct of grain ethanol pro-

duction—to supplement animal feed, so that expanding biofuel production doesn't lead to shortages of feed supplements for livestock.

In Pennsylvania, ARS technology has enabled a new commercial undertaking for producing fuel ethanol from winter barley, which is giving farmers along the eastern seaboard a profitable off-season crop that won't compete with food production and that protects soils from eroding into the Chesapeake Bay during winter. On the other side of the country, in the Pacific Northwest, recent studies have indicated that even though switchgrass hails from the East, it might produce yields that are just as good—or maybe even better—in the West (see article, page 4). And as a result of exemplary teamwork between ARS scientists, state and university agronomists, and USDA's Natural Resources Conservation Service, the Colville Confederated Tribes in Washington State might soon be able to grow enough canola on their lands to make biodiesel for fueling their fleet of school buses and logging trucks (see *Agricultural Research*, October 2010).

In February 2010, President Barack Obama outlined a series of steps his administration is taking to enhance American energy independence and build a foundation for a new, clean-energy economy. These steps included a new federal strategy for meeting the country's biofuel targets—and USDA efforts are crucial to the success of this strategy.

Agencies throughout USDA, including ARS, have been tasked with accelerating the commercial establishment of advanced biofuels. ARS is focused on finding ways to advance sustainable production and management of existing agricultural and forest systems over a range of settings across the country.

Given our history and our expertise in working with biofuels, it's not surprising that ARS is working with the USDA Forest Service (FS) to lead five newly established USDA Regional Biomass Research Centers. This USDA-led effort will help

ensure that dependable supplies of needed feedstocks are available for production of advanced biofuels to meet legislated goals and market demand. Just as important, the plan sets out to include as many rural areas across the country as possible, so that the economic benefits of biofuel production are as widespread as possible.

The research centers are designed as strategic, coordinated networks of existing ARS and FS scientists and facilities linked not by new buildings or single locations, but by existing and new relationships. The centers will provide the critical mass needed to develop high-performance teams that help guide biomass research across the government.

ARS and FS scientists will team up through the Southeastern Regional Center to work on production of herbaceous, forest, and agroforestry feedstock systems. Work at the Central-East Regional Center will focus on perennial grass biomass systems, while work at the Northern-East Regional Center will target woody biomass and forest biomass systems. Scientists at the Western Regional Center will mainly study new energy-crop systems, and the Northwestern Regional Center researchers will focus on oilseed, forest biomass, and crop residue systems.

For a while, Ford tried producing fuel from Danish potatoes. We know that we'll need a mix of crops and technologies to meet our bioenergy goals, and maybe potatoes won't make that final cut. But even if they don't, we'll still use the leftover oil from making French fries to brew up some biodiesel for the road.

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